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**PETITION FEE**

Under 37 CFR 1.17(f), (g) &amp; (h)

**TRANSMITTAL**

(Fees are subject to annual revision)

Send completed form to: Commissioner for Patents  
P.O. Box 1450, Alexandria, VA 22313-1450

<i>Application Number</i>	<b>10/786,108</b>
<i>Filing Date</i>	<b>February 26, 2004</b>
<i>First Named Inventor</i>	<b>Y. KANEDA, et al</b>
<i>Art Unit</i>	
<i>Examiner Name</i>	
<i>Attorney Docket Number</i>	<b>520.43541X00</b>

Enclosed is a petition filed under 37 CFR §1.102(d) that requires a processing fee (37 CFR 1.17(f), (g), or (h)). Payment of \$ 130.00 is enclosed.

This form should be included with the above-mentioned petition and faxed or mailed to the Office using the appropriate Mail Stop (e.g., Mail Stop Petition), if applicable. For transmittal of processing fees under 37 CFR 1.17(i), see form PTO/SB/17i.

**Payment of Fees** (small entity amounts are NOT available for the petition (fees)

- The Commissioner is hereby authorized to charge the following fees to Deposit Account No. 50-1417:
- petition fee under 37 CFR 1.17(f), (g) or (h)       any deficiency of fees and credit of any overpayments
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**Petition Fees under 37 CFR 1.17(f):****Fee \$400****Fee Code 1462**

For petitions filed under:

- § 1.53(e) - to accord a filing date.  
 § 1.57(a) - to according a filing date.  
 § 1.182 - for decision on a question not specifically provided for.  
 § 1.183 - to suspend the rules.  
 § 1.378(e) for reconsideration of decision on petition refusing to accept delayed payment of maintenance fee in an expired patent.  
 § 1.741(b) - to accord a filing date to an application under § 1.740 for extension of a patent term.

**Petition Fees under 37 CFR 1.17(g):****Fee \$200****Fee code 1463**

For petitions filed under:

- §1.12 - for access to an assignment record.  
 §1.14 - for access to an application.  
 §1.47 - for filing by other than all the inventors or a person not the inventor.  
 §1.59 - for expungement of information.  
 §1.103(a) - to suspend action in an application.  
 §1.136(b) - for review of a request for extension of time when the provisions of section 1.136(a) are not available.  
 §1.295 - for review of refusal to publish a statutory invention registration.  
 §1.296 - to withdraw a request for publication of a statutory invention registration filed on or after the date the notice of intent to publish issued.  
 §1.377 - for review of decision refusing to accept and record payment of a maintenance fee filed prior to expiration of a patent.  
 §1.550(c) - for patent owner requests for extension of time in ex parte reexamination proceedings.  
 §1.956 - for patent owner requests for extension of time in inter partes reexamination proceedings.  
 § 5.12 - for expedited handling of a foreign filing license.  
 § 5.15 - for changing the scope of a license.  
 § 5.25 - for retroactive license.

**Petition Fees under 37 CFR 1.17(h):****Fee \$130****Fee Code 1464**

For petitions filed under:

- §1.19(g) - to request documents in a form other than that provided in this part.  
 §1.84 - for accepting color drawings or photographs.  
 §1.91 - for entry of a model or exhibit.  
 §1.102(d) - to make an application special.  
 §1.138(c) - to expressly abandon an application to avoid publication.  
 §1.313 - to withdraw an application from issue.  
 §1.314 - to defer issuance of a patent.

Name (Print/Type)	<b>Carl I. Brundidge</b>	Registration No. (Attorney/Agent)	<b>29,621</b>
Signature		Date	March 7, 2005

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.



520.43541X00

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicants: Y. KANEDA, et al  
Serial No.: 10/786,108  
Filed: February 26, 2004  
For: STORAGE MANAGEMENT METHOD

**PETITION TO MAKE SPECIAL  
UNDER 37 CFR 1.102(d) and MPEP. §708.02, VIII**

**MS Petition**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

March 7, 2005

Sir:

**1. Petition**

Applicants hereby petition to make this application **Special**, in accordance with 37 CFR §1.102(d) and MPEP 708.02, VIII. The present invention is a new application filed in the United States Patent and Trademark Office on February 26, 2004 and as such has not received any examination by the Examiner.

**2. Claims**

Applicants hereby represent that all the claims in the present application are directed to a single invention. If upon examination it is determined that all the claims presented are not directed to a single invention, Applicants will make an election without traverse as a prerequisite to the granting of special status.

### **3. Search**

Applicants hereby submit that a pre-examination search has been made by a professional searcher.

The field of search covered:

Class Subclasses

711 6, 112, 114, 122, 142, 143

The above subclasses represent areas deemed to contain subject matter of interest to one or more of the search features. The initial search was conducted using the US Patent Office's Examiner Application Search Tool (EAST) database and image retrieval system. The EAST database contains images of all issued US patents and published US patent applications searchable by subclass or document number. The EAST database also contains the searchable full text of US patents issued since 1971; the searchable full text of all US published patent applications; and the searchable abstracts of a large number of patents and patent applications from the European and Japanese Patent Offices. We used keyword searching and forward/backward cross-referencing to locate relevant art.

### **4. Copy of References**

A listing of all references found by the professional searcher is provided by a Form PTO-1449 and copies of the references and the Form PTO-1449 are submitted as part of an Information Disclosure Statement (IDS) filed on even date.

## **5. Detailed Discussion of the References and Distinctions Between the References and the Claims**

Below is a discussion of the references uncovered by the search and cited in the IDS filed on even date that appear to be most closely related to the subject matter encompassed by the claims of the present application, and which discussion particularly points out how Applicants' claimed subject matter is distinguishable over those references. All other references uncovered by the search and cited in the IDS filed on even date are **not** treated in detail herein.

### **a. Detailed Discussion of the References**

Burkes (U.S. Patent No. 5,651,133) shows a method for avoiding over-commitment of virtual capacity in a redundant hierachic data storage system. The data storage system includes a disk array of multiple storage disks of selected capacities that define a physical storage space of a total physical capacity, the physical storage space being mapped into a RAID-level virtual storage space which presents the physical storage space as multiple RAID areas, the RAID areas including mirror RAID areas which store data according to mirror redundancy and parity RAID areas which store data according to parity redundancy, the RAID-level virtual storage space being mapped into an application-level storage space. The system includes computing a total virtual capacity of the application-level virtual storage space that can be committed to a user based upon the provision for the minimum percentage of user data to be kept in mirror RAID areas and the remaining percentage of user data to be kept in parity RAID areas. (See Abstract, figures 1-9, column 1 lines 55-67,

column 2 lines 1-50, column 10 lines 30-67 and column 11 lines 1-40).

Nelson (U.S. Patent No. 5,666,512) shows a method for providing storage space in a hierachic storage disk array for use in rebuilding in the event a storage disk fails, the disk array having a plurality of storage disks that define a physical storage space the physical storage space being mapped into a RAID-level virtual storage space. The system has a hierachic disk array having a plurality of storage disks that define a physical storage space; a disk array controller coupled to the disk array for coordinating transfer of user data to and from the storage disks; a memory manager operatively coupled to the disk array controller to manage a map of the physical storage space into a RAID-level virtual storage space. The system includes a method for providing storage space for use in rebuilding in a hierachic data storage system, the method comprising the following steps: mapping the RAID-level virtual storage space into an application-level virtual storage space; dynamically migrating the user data between the mirror and parity RAID areas; and computing a capacity of the application-level virtual storage space that can be committed to a user without including a capacity of the largest size storage disk. (See Abstract, figures 1-8, column 2 lines 5-45, column 3 and column 11 lines 30-60).

Bauman (U.S. Patent No. 6,457,101) shows a system and method for providing the speculative return of cached data within a hierarchical memory system. The hierarchical memory structure includes a main memory coupled to multiple first storage devices, each of which stores data signals retrieved from the main memory. Ones of the first storage devices are further

respectively coupled to second storage devices, each of which stores data signals retrieved from the respectively coupled first storage devices. In the preferred embodiment, the first and second storage devices are cache memories, and the main memory is a directory-based memory that includes a directory to indicate which of the other memories is storing a copy of addressable portions of the memory data. (See Abstract, figures 1-10, column 5-6, column 7 lines 1-30).

Murotani (U.S. Patent No. 6,779,078) shows a data storage system and method of hierarchical control thereof. The method of data transfer in a data storage system includes: storing data among a plurality of data storage units, each data storage unit comprising a controller and a plurality of storage devices organized into one or more logical volumes, wherein logical volumes from two or more data storage units define a logical volume group, wherein a first application is associated with said logical volume group such that data written from said first application is written to said logical volume group; monitoring a performance of each of said logical volumes to produce performance information that is associated with each of said logical volumes; keeping allocation information relating to said data, to said logical volumes which contain said data said, and to said data storage units which contain said logical volumes; gathering performance information from each data storage unit. (See Abstract, figures 1-6, column 1 lines 20-67, column 2 lines 1-45).

Honma (U.S. Patent Application Publication No. 2002/0002656) shows an information processing system and a multi-level hierarchical storage device

for use in the information processing system having a plurality of instruction processors and a plurality of main storage devices. The multi-level hierarchical storage device includes a first-cache storage device of a write-through type provided for each of the instruction processors, a second-cache storage device of a write-back type for each of the main storage devices, and a third-cache storage device of a write-through type provided between the first and second cache storage devices. (See Abstract, figures 1-8, paragraphs [0023]-[0027], [0098]-[0102]).

Nagasuka (U.S. Patent Application Publication No. 2004/0250007) shows a storage management method. There is provided a management computer comprising: a plurality of pairs of one or more volumes and a disk control unit for managing configuration of a storage device used by a host computer. The computer may include: a unit for storing information described in a disk management table in a disk control unit transmitted from respective disk control units together with identifiers of the disk control units in the storage device accessible by the management computer; a unit for requesting the disk control device to which the volume corresponding to a requested group or a requested volume identifier belongs to acquire information on a volume list concerning a volume belonging to the group or the volume thus requested. (See Abstract, figures 1-7, paragraphs [0005]-[0011], [0021]-[0023], [0031]-[0035]).

Takada (JP0 2000-163298A) shows an information management system for plural storage devices to enable plural storage devices to be used through one interface and to expand the capacity in a system. In an

information processing system provided with a controller and plural storage devices. The plural storage devices are provided with a primary storage device and a secondary storage device which forms the hierarchical structure of the primary storage device and has a large data capacity, the controller performs the information management of the primary and secondary storage devices by using a device driver that respectively operates and controls the primary and secondary storage devices. (See Abstract).

**b. Distinctions Between the References and the Claims**

The present invention as recited in the claims is not taught or suggested by any of the above noted references whether taken individually or in combination with each other or in combination with any of the other references now of record.

The present invention as recited in the claims is directed to a computer system, a management computer and a management method operating in the management computer, wherein the computer system includes a plurality of storage units each containing one or more volumes for storing data used by the computer and a management computer for managing the status of the storage units.

According to the present invention, the computer system further includes one or more first level storage units each containing one or more volumes for storing data used by the computer, one or more second level storage units each of which is connected through a communication path to, and hierarchically linked to, one of the first level storage units, volume

information collecting means for collecting means for collecting information on the volumes in the first and second level storage units, hierarchical information collecting means for collecting information of hierarchical relationships between volumes contained in the first and second level storage units, and effective capacity calculating means for calculating the total effective capacity based on the volume information in the hierarchy information.

Further, according to the present invention, the management computer executes programs corresponding to the volume information collecting means, the hierarchical information collecting means and the effective capacity calculating means as described above.

Still further, the management method includes steps corresponding to the functions performed by the same such means as described above.

The above described features of the present invention are not taught or suggested by any of the above described references or any of the other references of record whether taken individually or in combination with each other. Particularly, the above described features of the present invention as recited in the claims are not taught or suggested by Burkes, Nelson, Bauman, Murotani, Honma, Nagasuka and Takada. Specifically, these references fail to teach or suggest features of the present invention as recited in the claims particularly with regard to collecting information on the volumes contained in the first level and the second level storage units, collecting information on the hierarchical relationships between volumes contained in the first level storage units and volumes contained in the second level storage units and calculating

the total effective capacity based on the volume information and the hierarchy information thus collected.

For example, Burkes teaches a method for avoiding over-commitment of virtual capacity in a redundant hierachic data storage system. However Burkes does not teach or suggest collecting information on the volumes contained in the first level and the second level storage units, collecting information on the hierarchical relationships between volumes contained in the first level storage units and volumes contained in the second level storage units and calculating the total effective capacity based on the volume information and the hierarchy information thus collected as recited in the claims.

Further, Nelson teaches a method for providing storage space in a hierachic storage disk array for use in rebuilding if a disk fails. However, Nelson does not teach or suggest collecting information on the volumes contained in the first level and the second level storage units, collecting information on the hierarchical relationships between volumes contained in the first level storage units and volumes contained in the second level storage units and calculating the total effective capacity based on the volume information and the hierarchy information thus collected as recited in the claims.

Still further, Murotani teaches a data storage system and method of hierarchical control thereof. However, Murotani does not teach or suggest collecting information on the volumes contained in the first level and the second level storage units, collecting information on the hierarchical

relationships between volumes contained in the first level storage units and volumes contained in the second level storage units and calculating the total effective capacity based on the volume information and the hierarchy information thus collected as recited in the claims.

Still further yet, Honma teach an information processing system and a multi-level hierarchical storage device for use in the information processing system. However, Honma does not teach or suggest collecting information on the volumes contained in the first level and the second level storage units, collecting information on the hierarchical relationships between volumes contained in the first level storage units and volumes contained in the second level storage units and calculating the total effective capacity based on the volume information and the hierarchy information thus collected as recited in the claims.

Even further, Nagasuka teaches a storage management method. However, Nagasuka does not teach or suggest to collecting information on the volumes contained in the first level and the second level storage units, collecting information on the hierarchical relationships between volumes contained in the first level storage units and volumes contained in the second level storage units and calculating the total effective capacity based on the volume information and the hierarchy information thus collected as recited in the claims.

Even further still, Takada teaches an information management system for plural storage devices to enable plural storage devices to be used through one interface and to expand the capacity in one system. However, Takada

does not teach or suggest collecting information on the volumes contained in the first level and the second level storage units, collecting information on the hierarchical relationships between volumes contained in the first level storage units and volumes contained in the second level storage units and calculating the total effective capacity based on the volume information and the hierarchy information thus collected as recited in the claims.

Further yet, Bauman teaches a system and method for providing the speculative return of cached data within a hierarchical memory system. However, Bauman does not teach or suggest collecting information on the volumes contained in the first level and the second level storage units, collecting information on the hierarchical relationships between volumes contained in the first level storage units and volumes contained in the second level storage units and calculating the total effective capacity based on the volume information and the hierarchy information thus collected as recited in the claims.

Accordingly, the features of the present invention as recited in the claims are not taught or suggested by any of the above described references or the other references of record whether taken individually or in combination with each other.

Based on the above, Applicants submit that the claims of the present application are patentable over the above described references and the other references of record whether taken individually or in combination with each other.

**6. Fee (37 C.F.R. 1.17(i))**

The fee required by 37 C.F.R. § 1.17(i) is to be paid by:

[ X] the Credit Card Payment Form (attached) for \$130.00.

[ ] charging Account \_\_\_\_\_ the sum of \$130.00.

A duplicate of this petition is attached.

Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, or credit any overpayment of fees, to the deposit account of MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C., Deposit Account No. 50-1417 (520.43541X00).

Respectfully submitted,

MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.



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